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Notes:

1. Untranslatable words are replaced with asterisks (****).
2. Texts in the figures are not translated and shown as it is.

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FULL CONTENTS

Claim(s)]

Claim 1] Make network connection and a server and the node like a home terminal [said server] The distribution data which consists at least of one side of the data used by the program executed by said node, and said node, Have the move agent distribution method which distributes said distribution data to said node, and [said node] [having the move agent execution method which sends out distribution data to a node different from at least one module of the module which loads and processes the module and data which carry out load execution and execute a program] In the move agent control method which makes it possible to return to a server after sending out said distribution data from a server and carrying out round execution of each node The move agent distribution method which adds to distribution data and is distributed when the round data in which it is shown which node is patrolled is stored in the server and distributed, The move agent control method characterized by controlling a round place by having the move agent execution method which determines and distributes the node which reads the added round data and moves to the next.

Claim 2] The move agent control method characterized by having the distribution zone division method which divides the node group to patrol into two or more groups in the move agent control method according to claim 1, and distributes said distribution data to each group.

Claim 3] The sum total of the time which patrolling one node takes in said distribution zone division method is made into the round time in a group. The move agent control method according to claim 2 characterized by having the distribution zone division method of dividing a group so that the round time in a group of each group may fit in within a time [which was specified beforehand].

Claim 4] The move agent control method according to claim 2 characterized by choosing a node in said distribution zone division method so that the round time in a group of each group may be equalized, and having the distribution zone division method of dividing a group with the group number specified beforehand.

Claim 5] The move agent control method according to claim 2 characterized by having the distribution zone division method of dividing a group in said distribution zone division method so that the communication cost between nodes may become low.

Claim 6] In the move agent control method given in five, from Claim 2, [one group] It is the move agent control method characterized by ending a round when two distribution data of the same contents is sent out, the round data and the round data of the order of reverse which were added to one side are added to another

side and both sides meet except round data.

[Claim 7] The move agent control method equipped with the fault management method which will display the obstacle information on a display device as storing of the obstacle information on a server in the move agent control method according to claim 1 if the obstacle of a node is discovered.

[Claim 8] The move agent control method characterized by adding the round data except the obstacle information stored in the server to a move agent in the move agent control method according to claim 7.

[Claim 9] The move agent control method characterized by having the move agent automatic distribution method which distributes in the move agent control method according to claim 1 according to the schedule created beforehand.

[Claim 10] The move agent control method characterized by having the round data maintenance control method of editing round data, in the move agent control method according to claim 1.

[Claim 11] In the node equipped with a means to be the server and node according to claim 1 which made network connection, and to communicate via the base station like a cellular phone, and a transceiver connection means to communicate with other nodes without going via a base station Divide two or more nodes into the group in which transceiver connection is possible mutually, and it communicates with the node in which transceiver connection is possible by transceiver connection. The move agent control method characterized by having the distribution zone division method of dividing a group so that at least two base stations may be included in one group when communicating with the node which is not so via a base station.

[Claim 12] When an obstacle occurs in a base station connectable from a node and it becomes impossible to communicate with the node of a server or another group in the move agent control method according to claim 11, The move agent control method characterized by having the obstacle evasion correspondence procedure which transmits to a node connectable with a base station without an obstacle by transceiver connection, and transmits to a server or another group from the node in which said connection is possible.

[Claim 13] The move agent control method characterized by having the obstacle evasion correspondence procedure which searches the node which patrols the node in which transceiver connection is possible, and does not have an obstacle, and in which a base station and connection are possible in the move agent control method according to claim 12 when an obstacle is in the base station in which transceiver connection is possible.

[Claim 14] [the server to which the node which is at least one round place which performs a move agent was connected] The move agent control method characterized by predicting beforehand the round time which a round takes based on the information on a round place, and the information on distribution data, dividing a round place into two or more groups so that said round time may be held down to below default value, and distributing a move agent to said each group.

[Claim 15] It is the recording medium which stored the program of the move agent control method which the server to which the node which is at least one round place which performs a move agent was connected performs and in which computer reading is possible. Said method is a recording medium characterized by predicting beforehand the round time which a round takes based on the information on a round place, and the information on distribution data, dividing a round place into two or more groups so that said round time may be held down to below default value, and distributing a move agent to said each group.

[Claim 16] [the move agent control device to which the node which is at least one round place which

performs a move agent was connected] A means to predict beforehand the round time which a round takes based on the information on a round place, and the information on distribution data, The move agent control device characterized by having a means to divide a round place into two or more groups so that said round time may be held down to below default value, and a means to distribute a move agent to said each group.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to distribution of the move agent who executes a service program, and the method of execution, moving between two or more home terminals linked to a network.

[0002]

[Description of the Prior Art] There is a move agent as technology of advancing execution of a program, moving between two or more computers. The conventional move agent had described the round usual route and a round algorithm in the program of an agent maker. The technology about obstacle evasion when an obstacle is in an agent's movement place is described by JP,11-149426,A.

[0003]

[Problem to be solved by the invention] Of the conventional move agent, since the determination method of the movement place was described in the agent program, there were the following problems.

[0004] (1) Control of this time was difficult by the end of a round. Moreover, since the performance in the end of a round tip was not uniform, prediction of this time was also difficult by the end of a round.

[0005] (2) Since it was difficult for a round place to have made one agent patrol collectively two or more service programs which are not completely in agreement, the agent's distribution was needed for every service program, and communication cost had started.

[0006] (3) When there were many round places, or when a round place was changed frequently, it was difficult to carry out maintenance control of the round place.

[0007] The purpose of this invention is to offer the move agent control method which can control the time which a move agent's round takes.

[0008]

[Means for solving problem] The move agent control method of this invention enforces the following methods.

[0009] Separate and manage a round list and an agent program and the move agent distribution method which adds and distributes a round list to an agent program at the time of agent distribution is formed in server equipment. By forming the move agent execution method of reading the added round list and deciding the following movement place in each home terminal unit Combination and division of a round list were enabled before distribution, and time which a round takes by distributing two or more agents with the same agent program was made controllable.

[0010] Moreover, it becomes possible by adding and distributing one round list to two or more agent programs from the agent program and the round list having dissociated to lower communication cost.

[0011] Moreover, by preparing the maintenance control means of a round list in server equipment, maintenance control in the case of being updated frequently when there are many round places was made

easy.

0012]

Mode for carrying out the invention] The work example about this invention is hereafter explained using a figure.

0013] Drawing 1 shows whole form figure and apparatus composition of 1 use by this invention first.

0014] Server equipment 100 consists of the secondary memory 101, the main memory unit 102, the central processing unit 103, a communication apparatus 104, and a display device 109. There are the primary control program 105, the move agent distribution program 106, the communications program 107, and database maintenance control program 108 grade in the main memory unit 102.

0015] The home terminal unit 110 consisted of the secondary memory 111, the main memory unit 112, the central processing unit 113, a communication apparatus 114, and a home network communication apparatus 115, and has connected the home network communication apparatus 115 to the home network which electric products, such as an electric light and an air-conditioner, connect. There are the primary control program 116, the move agent execution program 117, the home network communications program 118, and an Internet communications program 119 in the main memory unit 112. Both server equipment 100 and the home terminal unit 110 are connected to a wide area network. Many home terminals of the same apparatus composition as the home terminal unit 110 have connected with a wide area network.

0016] The move agent distribution function of a server 100 is shown in drawing 2. To the home terminal group linked to a wide area network, a server 100 distributes the move agent 210 and provides service. In that case, a distribution place is divided into two or more groups so that specific conditions may be fulfilled, and a move agent is distributed to each group. The move agent distribution program 106 is performing the move agent's 210 distribution. If the procedure at the time of distribution is required, it carries out the group division of all the distribution places, and it generates the round list 201 for several minutes of a group. The move agent 210 is generated from this round list 201, the service program data 202, and the center signature 203. The move agent 210 consists of a required service program 211, a round list 212 for every group, and center signature 203. Although it is possible for two or more service programs 211 to be included in one move agent, it is necessary to execute no service programs at all the home terminals to patrol. The information on the service program which should be executed in a home terminal is included in the round list 212. After the move agent 210 goes round, executes a service program, collects the data of the fee collection information or each home terminal etc. and ending a round, he returns to a server 100.

0017] The detailed function of the move agent distribution program 106 in a server 100 is explained to drawing 3. The execution management data 310, the service schedule 311, the contract data 312, the service program data 202, and the signature data 203 are beforehand stored in the secondary memory 101 of a server 100. The move agent distribution program 106 consists of the move agent run state Management Department 301, the service schedule management part 302, the agent distribution part 303, a message processing part 307, and a collection data total processing part 308. Furthermore, the agent distribution part 303 consists of the distribution zone processing part 304 and the agent generation part 306 containing the round prediction time calculation part 305.

0018] Each function is explained below.

0019] The move agent run state Management Department 301 supervises a move agent's round situation

distributed with reference to the move agent run state management data 310. When a move agent does not return sharply more than the time limit of a round, the display to a display device, generating of sound/sound, etc. report to the administrator of a server. Moreover, by the demand from an administrator, the execution situation 2102 of a move agent like the example of a display shown in drawing 21 is displayed on a display device. When the move agent under move agent list 2103 is specified using pointing devices, such as a mouse, on the display screen 2101, a corresponding walking beat is shown on the map 2104 in a distribution area.

0020] The service schedule management part 302 takes out a demand event which performs agent distribution which contains the service program concerned at the time which should distribute service, referring to the service schedule 311 which stored the distribution schedule of service.

0021] The agent distribution part 303 is started from the service schedule management part 302. The distribution zone split application part 304 generates the round list data 201 first from the contract data 312, the obstacle data 313, log data 314, and the data of a service program 202. Next, the agent generation part 306 generates and distributes a move agent from the service program data 202, the round list data 201, and the center signature data 203.

0022] The message processing part 307 performs error processing of the message 316 sent by the move agent 210 under round, and it stores obstacle information in the obstacle data 313, and refer to it for it at the time of next round list generation.

0023] The end processing part 308 of a move agent performs total processing of the collection data which the move agent 210 has collected, and stores it in the fee collection data 315 and log data 314. The fee collection data 315 is used for calculation of the usage fee of service, and uses log data 314 as the reference data at the time of next round list generation.

0024] The move agent's 210 in the home terminal unit 110 order of the real way is shown in drawing 4. The certificate and public key 404 of the center server are beforehand stored in the secondary memory 111 of a home terminal. The move agent execution program 117 consists of the center signature attestation part 401, a service program execution part 402, and an agent distribution part 403. The center signature 213 which the move agent 210 has when the center signature attestation part 401 still has a move agent in the home terminal in front of one, The certificate and public key 404 of a center server which are beforehand stored in the home terminal perform processing which attests the move agent's 210 justification. After attesting, it permits that the move agent 210 moves to the home terminal concerned. The service program execution part 402 executes the program which should perform of the service programs 211 with the execution service program data described by the round list 212, and stores in a move agent's collection data 405 the data obtained by the execution. The home terminal which a move agent should patrol next with reference to a round list is obtained, the agent distribution part 403 asks for attestation of the center signature by the home terminal, and if attested, it will distribute the move agent 210 to the following home terminal. When a move agent's distribution by the connection improper to the following home terminal, un-attesting of the following home terminal, move agent distribution refusal of the following home terminal, etc. is impossible here, it waits to generate the obstacle message 316, to send to the center server 100, and for a center server to send an obstacle evasion round list.

0025] The example of contents of the contract data 312 is shown in drawing 5. The contract data 312 is a

gathering to much contract information 501, the contract information 501 has one contract information for every home terminal, and the contents consist of home terminal information, contractor information, contract service information, and a communication management zone. Home terminal information has transmission speed, execution performance, and memory size as the discernment numbers (telephone number for communication of a home terminal etc.) of a home terminal, and model information on a terminal. Contractor information consists of a contractor name, an address, a telephone number, and correspondent bank account information. Contract service information is the list containing only the number of services which has made a contract of the information which combined the period which receives the name of the service a contract of is made, and service. A communication management zone is the zone ID of the zone which becomes the same communication fee money] when communicating (it telephones).

0026] The example of contents of the service program data 202 is shown in drawing 6. The service program data 202 consists of gatherings to the service program peculiar information 601 for several kind minutes of the service to provide. The service program peculiar information 601 consists of a service name, attributes (service offer company name etc.), standard execution time, standard use memory size, the price of service, a distribution plan, the round time limit, and program main part data. A distribution plan is for deciding whether distribute by habits of punctuality, or carry out by the method of holding down costs, such as communication charges, even if a gap of some time takes place, and it can choose according to the character of service.

0027] The example of contents of the obstacle data 313 is shown in drawing 7. The obstacle data 313 is a gathering to the obstacle information 701 reported in the past. The obstacle information 701 consists of the discernment number of the obstacle flag which shows whether it is [present obstacle] under generating, and the home terminal which has caused the obstacle, generating time when the obstacle occurred, and recovery time which the obstacle recovered.

0028] The example of contents of the service schedule management data 311 is shown in drawing 8. The service schedule management data 311 gathers only the number of kinds of service of the schedule information 801 on each service. The schedule information 801 on each service consists of a service name, real line spacing, and detailed execution time. Real line spacing shows the interval from 1 time per month, and one service execution per week etc. to the next execution, and, in one service per week, detailed execution time specifies [of what day of the week] in how many minutes distribution is started when, for example.

0029] The move agent's 210 example of contents composition is shown in drawing 9. The move agent 210 consists of the number of service programs which a move agent's discernment number, the round list 901, a center signature, and a move agent have, a program main part of each service, and a set of the collection data list 902 which stores the result of every service program. The round list 901 consists of flag data in which it is shown which service of the service program groups contained in the discernment number of a round place home terminal and the move agent 210 is performed. The example of flag data of the round list 901 shown in drawing 9 shows performing Service A, Service C, and service D, and performing Service A and service B at the home terminal b at the home terminal a.

0030] The example of composition of the obstacle message 316 is shown in drawing 10. The obstacle message 316 consists of a move agent's discernment number, a home terminal discernment number with obstacles, generating/recovery of an obstacle, and generating time of a phenomenon. During a move agent

ound, when a move agent cannot be transmitted to the following round place home terminal for a certain Reason, a moved material home terminal generates the obstacle message 316, and transmits at a server 100.

0031] The example of composition of the move agent run state management data 310 for managing a move agent's run state distributed to drawing 11 is shown, and it explains. The agent run state management data 310 consists of the service program name list and the round data 1101 which are contained in the condition (the end of a round during a round, obstacle measure middle class) of the move agent ID and a move agent, and a move agent. The round data 1101 consists of the time of origin of a round list and a move agent, the end schedule time of a round, round finish time, and obstacle data. Each processing of the move agent distribution program 106 manages a move agent's round situation and obstacle situation with the move agent run state management data 310.

0032] For example, when the move agent 2 ends a round and has returned in the example shown in drawing 11, [the end processing part 308 of a move agent] While making the condition of the move agent 2 of the move agent run state management data 310 the end of a round and recording collection data on secondary storage equipment The condition of other agents (the move agent 1, move agent 3) including the same service (service A, B, and D) is investigated. When all have become the end of a round, it is judged as the end of a round of Service A, B, and D, and the move agents 1, 2, and 3 are deleted from the move agent execution situation management data 310.

0033] Moreover, when the obstacle message 316 has been transmitted from a certain home terminal, [the message processing part 307] A round list is specified with the move agent run state management data 310 and the move agent to whom the obstacle has happened from the move agent discernment number of the obstacle message 316. The obstacle evasion round list for which the obstacle home terminal was excepted from the round list is generated, and it sends to the home terminal which has transmitted the obstacle message.

0034] The case where an obstacle terminal is during a move agent round at drawing 12 is illustrated. By the round list of [at the times of a round start], when it is due to go round in order of the home terminal m, the home terminal n, and the home terminal o and an obstacle occurs at the terminal of the home terminal n, it detects that it cannot be transmitted although the home terminal m tries transmission to the home terminal n, but it is with obstacles. Then, the home terminal m generates the obstacle message 316, and transmits to the center server 100. The discernment number of the home terminal m which caused the obstacle, and a move agent's discernment number are contained in the obstacle message 316. The center server 100 receives the obstacle message 316, and a round list is obtained from the discernment number of the move agent to whom it was reported the move agent run state management data 310. The obstacle evasion round list 1201 patrolled in order of the home terminal m except the home terminal n which was with obstacles from the round list concerned, and the home terminal o is generated, and it transmits to the home terminal m. With the obstacle evasion round list 1201, the home terminal m transmits a move agent to the following round place home terminal o.

0035] The flow chart of the event processing in the server 100 shown in drawing 1 is shown in drawing 13, and a processing flow is explained below.

0036] Processing 1301: Read one event of event cue.

- 0037] Processing 1302: When an event is a distribution start demand event of service, progress to processing 1303, and progress to processing 1304 except it.
- 0038] Processing 1303: Perform agent distribution processing of the move agent distribution program 106, and return to processing 1301. Drawing 14, drawing 15, and drawing 16 explain a detailed processing flow.
- 0039] Processing 1304: When an event is an agent arrival report event, progress to processing 1305, and progress to processing 1306 except it.
- 0040] Processing 1305: Perform end processing of a move agent of the move agent distribution program 106, and return to processing 1301. Drawing 17 explains a detailed processing flow.
- 0041] Processing 1306: When an event is a message arrival report event, progress to processing 1307, and progress to processing 1308 except it.
- 0042] Processing 1307: Perform message processing of the move agent distribution program 106, and return to processing 1301. Drawing 18 explains a detailed processing flow.
- 0043] Processing 1308: Perform other event processing which should be performed by a server 100, and return to processing 1301.
- 0044] The event processing routine of a server shows the flow chart of the agent distribution processing 1303 of the move agent distribution program called at the time of necessity to drawing 14, and shows a processing flow below.
- 0045] Processing 1401: Generate a round list for every zone which divided the distribution zone of service when there was necessity, and divided it. The detailed contents of processing are later shown and mentioned to drawing 15 and 16.
- 0046] Processing 1402: When it judges whether processings 1403 and 1404 were repeated and a repetition is completed about several round list minutes generated by processing 1401, end agent distribution processing and return to a calling agency.
- 0047] Processing 1403: Add a move agent discernment number to what merged the number of the services included in a round list, a center signature, and an agent, and a service program main part, and generate an agent. The information on a move agent discernment number, a round list, etc. is added to agent run state management data.
- 0048] Processing 1404: Transmit the agent who generated by processing 1403 to the home terminal of the head of a round list.
- 0049] The flow chart of the distribution zone split application 1401 called by agent distribution processing is shown in drawing 15, and a processing flow is shown below.
- 0050] Processing 1501: Sort the list of round places in the communication management zone of a home terminal. The thing of the same communication management zone is sorted for an address.
- 0051] Processing 1502: Compute the prediction time of the round by the round list of un-dividing. The detailed flow about round time prediction processing is later mentioned using drawing 16.
- 0052] Processing 1503: When the prediction time computed by processing 1502 is larger than the distribution time limit, progress to processing 1504, and when other, progress to processing 1509.
- 0053] Processing 1504: Divide a round list for every communication management zone of a home terminal.
- 0054] Processing 1505: When judging whether processing 1506, processing 1507, and processing 1508 were completed to all the divided round groups, progressing to processing 1509 when it ends, and not having

ended, progress to processing 1506 for the processing to the following round group.

0055] Processing 1506: Compute the prediction time of the round by a round list.

0056] Processing 1507: When the prediction time computed by processing 1506 is larger than the distribution time limit, progress to processing 1508, and return to processing 1505 except it.

0057] Processing 1508: Calculate the prediction time from the head of a round list one by one, and prediction time divides a round list before the home terminal beyond the distribution time limit, and considers the first half as one round list. The above-mentioned processing is repeated about the divided round list of the second half, and it divides so that no prediction time of round lists may exceed the distribution time limit.

0058] About one round list, the flow chart of the round time prediction processing 1502 which calculates the prediction time concerning a round is shown in drawing 16, and a processing flow is shown below.

0059] Processing 1601: Loop processing which adds prediction time one by one about all the home terminals of a round list. It judges whether calculation was completed, when it ends, a round time prediction processing routine is ended, and it returns to the call origin of a routine. When other, it progresses to processing 1602. Only the first time initializes prediction round time.

0060] Processing 1602: Add the time (size [of a move agent] * transmission speed of the home terminal concerned) which transmitting an agent to the following home terminal takes from the home terminal concerned to prediction round time. It progresses to processing 1603.

0061] Processing 1603: Loop processing which calculates execution prediction time one by one about all services performed in the home terminal concerned. It judges whether calculation of execution prediction time was completed, when it ends, it returns to processing 1601, and when other, it progresses to processing 1604.

0062] Processing 1604: Add the time (execution performance of the standard execution time * home terminal of service) concerning performing the service concerned in the home terminal concerned to prediction round time, and return to processing 1603.

0063] The flow chart of the end processing 1305 of agent execution which is the processing called by the event processing routine of a server at the time of necessity when a move agent ends a round and returns to a server is shown in drawing 17, and a processing flow is shown below.

0064] Processing 1701: Record the data collected to the move agent's 210 service collection data list 902 on the fee collection data 315 and log data 314.

0065] Processing 1702: Make the condition of the move agent of the move agent run state management data 310 concerned "an end of a round."

0066] Processing 1703: It is the branching processing which progresses to processing 1704 when all the move agents of the same service as the move agent concerned have ended the round, and ends the processing concerned except it.

0067] Processing 1704: Delete the move agent information on the service concerned from the move agent run state management data 310, and end this processing.

0068] The flow chart of the message arrival processing 1307 when receiving the message sent at the time of the obstacle under round called by the event processing routine of a server at the time of necessity is shown in drawing 18, and a processing flow is shown below.

0069] Processing 1801: When it is an obstacle message, progress to processing 1702, and end this

processing except it.

0070] Processing 1802: Add the contents of the obstacle message to obstacle data.

0071] Processing 1803: Obtain a round list from an obstacle message and move agent run state management data, delete the obstacle home terminal terminal in obstacle data from the list concerned, and generate an obstacle measure round list.

0072] Processing 1804: Transmit the obstacle measure round list generated by processing 1803 to the home terminal which has sent the obstacle message, and end this processing.

0073] The flow chart of the service schedule management routine 302 which manages a distribution start of the move agent who operates independently of the event processing routine of a server is shown in drawing 19, and a processing flow is shown below.

0074] Processing 1901: Acquire the present time information from a timer.

0075] Processing 1902: When the present time has the service which carries out a distribution start, progress to processing 1093, and return to processing 1901 except it.

0076] Processing 1903: Publish an agent distribution demand event.

0077] Next, the flow chart of the event processing routine including move agent execution processing with a home terminal is shown in drawing 20, and a processing flow is shown below.

0078] Processing 2001: Read an event from event cue.

0079] Processing 2002: It is the branching processing which progresses to processing 2003 when it is reception of a move agent, and progresses to processing 2009 except it.

0080] Processing 2003: It is distinction processing of the end of a loop which will progress to processing 2005 if it distinguished whether all execution of the service program which should be executed at the home terminal concerned was completed and has ended, and progresses to processing 2004 except it.

0081] Processing 2004: One service program is executed and it returns to processing 2003.

0082] Processing 2005: It is the branching processing which distinguishes whether the following distribution place is connectable, progresses to processing 2006 if connection is possible, and progresses to processing 2015 except it.

0083] Processing 2006: It is the branching processing which judges whether a center signature is attested at the following distribution place, progresses to processing 2007 when attested, and progresses to processing 2015 except it.

0084] Processing 2007: It is the branching processing which judges whether it is the following state which can be distribution place distributed, progresses to processing 2008 when it can distribute, and progresses to processing 2014 except it.

0085] Processing 2008: Transmit an agent to the following distribution place and return to processing 2001.

0086] Processing 2009: It is the branching processing which progresses to processing 2005 and progresses to processing 2010 except it when a round list is received in the round list waiting state.

0087] Processing 2010: It is the branching processing which progresses to processing 2012 and progresses to processing 2011 except it when an inquiry of the state which can be distributed is received.

0088] Processing 2011: When the attestation processing demand of a center signature is received, progresses to processing 2013 and progress to the branching processing which returns to processing 2001 except it.

0089] Processing 2012: Send a reply the propriety of distribution and return to processing 2001.

- [0090] Processing 2013: Perform attestation processing of a center signature, send a reply a result, and return to processing 2001.
- [0091] Next, another work example using this invention is explained using the figure after drawing 3, drawing 14 from drawing 6, drawing 19 from drawing 16, and drawing 22 from drawing 1.
- [0092] Although server equipment 100 and the home terminal unit 110 have hardware composition as shown in drawing 1 like the above-mentioned work example, respectively, a cellular phone is used for each communication apparatus 104,114, and as shown in drawing 22, it communicates via a base station 2200. However, it communicates directly in transceiver mode between the home terminals in which the transceiver node communication by a cellular phone is possible like the home terminal A1 of drawing 22, and the home terminal A2. In the part which can be used, it becomes possible by using transceiver mode communication to hold down communication charges.
- [0093] As shown in drawing 23 as contract data, the contract data 2300 which added the connection base station information 2301 on a home terminal and the home terminal information 2302 in which transceiver node connection is possible to the contract data 501 of the above-mentioned work example is used.
- [0094] A server 100 is first based on the contract data 2300, the obstacle data 313, log data 314, and the data of a service program 202 in the case of move agent distribution. A home terminal connectable in transceiver mode among the home terminals which are the targets of a round is group-sized, and the transceiver mode connection group table 2400 as shown in drawing 24 is generated. The transceiver mode connection group table 2400 serves as the list 2401 of home terminals which can communicate in transceiver mode from each base station ID2401. A round list is created for this group as the minimum constituent factor. At this time, round list data is created so that the base station which the home terminal contained in one round list data connects may be set or more to two. Like processing in the above-mentioned work example, since the home terminal in which one does not have a home terminal connectable in transceiver mode is sorted for the communication management zone and the address, it is group-sized and creates a round list.
- [0095] When trying to return a move agent via a base station from a certain home terminal during a move agent round at a server and it turns out that the obstacle has occurred in the connection base station, the home terminal concerned makes itself the starting point. The search demand of a base station without an obstacle is sent from itself one by one to all the home terminals in which transceiver mode communication is possible. The home terminal which received the search demand continues search by returning its own terminal ID, if there is no obstacle in the base station which he connects, and transmitting a search demand to other terminals in which transceiver mode connection is possible, if there is an obstacle also in its base station. It searches until it finds a base station without an obstacle or the home terminal in which transceiver node connection is possible is lost. When a base station without an obstacle is found as a result of search, the home terminal of the returned terminal ID transmits a move agent one by one in transceiver mode, and communicates via a base station from the terminal of search results.
- [0096] An example of the round list of move agents is shown in drawing 25, and the obstacle evasion method when an obstacle occurs in a base station is explained concretely. A group 1 is one round list, starts a round from the home terminal A1, and patrols it in the order which the arrow in a figure shows. Moreover, communication in transceiver mode is possible for the home terminals before and after a round list. It becomes, when a move agent's round is completed and an agent is returned to a server via a base station B

by home terminal B-2, and when it turns out that the obstacle has occurred in the base station B, home terminal B-2 gives a base station search demand to the home terminal B1. From the base station (B) which connects obstacle being under generating, the home terminal B1 transmits a base station search demand to the home terminal A4 further. The home terminal A4 which received the base station search demand checks that its base station A is functioning normally, and returns its own home terminal ID to the home terminal B1. The home terminal B1 transmits this reply to home terminal B-2. Home terminal B-2 which received the search reply sends the home terminal A4 by transceiver mode communication, and returns a move agent to a server via a base station A from the home terminal A4.

[0097] As mentioned above, by creating a round list so that two or more base stations connected to one round list from a home terminal may be included Obstacle evasion is attained by moving a move agent to the home terminal connected to a base station without an obstacle by transceiver mode communication, when an obstacle occurs in one base station, and transmitting a move agent to the home terminal of a server or other base stations from there.

[0098] In addition, as shown in drawing 26, the home terminal information 2601 in which transceiver mode communication is possible is stored in the home terminal unit 101 of the system which performs this example.

[0099] In order to realize this example, it is necessary to correct the contents of processing of the distribution zone split application part 304 contained in the move agent distribution program 106 in the above-mentioned work example, and the move agent execution program 117 of a home terminal. Hereafter, the flow chart of the processing flow of the distribution zone split application part 304 is shown in drawing 27, and the flow chart of the processing flow of the move agent execution program 117 is shown in drawing 28 and drawing 29.

[0100] Processing 2701: Divide the home terminal group of a round place into a transceiver mode connection group. Only the home terminal which cannot form a group is sorted in a communication management zone, and the inside of the same zone is sorted for an address.

[0101] Processing 2702: Compute the prediction time concerning the whole round by round time prediction processing. About the detailed flow about round time prediction processing, it has mentioned above using drawing 16.

[0102] Processing 2703: When the prediction time computed by processing 2702 is larger than the regular distribution time limit, progress to processing 2704, except it, end distribution zone split application and return to function call origin.

[0103] Processing 2704: To all transceiver mode connection groups, perform processing 2705 and processing 2706 and progress to processing 2707 after an end.

[0104] Processing 2705: The round prediction time of one group is computed by round time prediction processing.

[0105] Processing 2706: A group is unified so that the sum total of the prediction time of a group may not exceed the regular distribution time limit.

[0106] Processing 2707: When the prediction time which patrols all the home terminals that did not form a group exceeds the regular distribution time limit, it progresses to processing 2708, and except it, this distribution zone split application is ended and it returns to a calling agency.

- 0107] Processing 2708: The home terminal which did not form a group is divided into the group for every communication management zone.
- 0108] Processing 2709: Processing 2710, processing 2711, and processing 2712 are performed to the group divided by processing 2708, and after processing ending to all the groups, this distribution zone split application is ended and it returns to a calling agency.
- 0109] Processing 2710: The round prediction time of one group is computed.
- 0110] Processing 2711: When the round prediction time computed by processing 2710 is larger than the regulation distribution time limit, it progresses to processing 2712, and it returns to processing 2709 except it.
- 0111] Processing 2712: It divides into a group in which round prediction time does not exceed the regular distribution time limit.
- 0112] The move agent execution program 117 in a home terminal is shown in drawing 28 also including the evasion processing at the time of a base station obstacle, and is explained below.
- 0113] Processing 2801: An event is read from event cue.
- 0114] Processing 2802: When an event is move agent reception, it progresses to processing 2803 and progresses to processing 2809 except it.
- 0115] Processing 2803: Processing 2804 is repeated until it ends all the service programs that should be executed, and it progresses to the end post-processing 2805.
- 0116] Processing 2804: A service program is executed.
- 0117] Processing 2805: Good and the failure of connection with the following distribution place are detected, when connection is good, it progresses to processing 2806, and when it cannot connect, it progresses to processing 2816.
- 0118] Processing 2806: Center signature attestation processing of the following distribution place is performed, when attested, it progresses to processing 2807, and it progresses to processing 2819 except it.
- 0119] Processing 2807: If it asks the following distribution place whether to be the state which can be distributed and is in the state which can be distributed, it progresses to processing 2808, and it progresses to processing 2818 except it.
- 0120] Processing 2808: An agent is distributed to the following distribution place.
- 0121] Processing 2809: It is in the state waiting for a round list from a center server, and when an event is round list reception, it progresses to processing 2810 and progresses to processing 2811 except it.
- 0122] Processing 2810: A round list waiting state is ended and it progresses to processing 2805.
- 0123] Processing 2811: When an event is the state inquiry reception which can be distributed, it progresses to processing 2812, and it progresses to processing 2813 except it.
- 0124] Processing 2812: The propriety of the state which can be distributed is returned.
- 0125] Processing 2813: When an event is attestation demand reception, it progresses to processing 2814, and it progresses to processing 2815 except it.
- 0126] Processing 2814: Attestation processing of a center signature is performed and the result is returned.
- 0127] Processing 2815: Base station obstacle evasion processing is performed. The processing flow of base station obstacle evasion processing is later shown and mentioned to drawing 29.
- 0128] Processing 2816: When an obstacle is in a connection base station, it progresses to processing 2817, and it progresses to processing 2819 except it.

0129] Processing 2817: A normal base station search demand is transmitted to the terminal in which transceiver mode communication is possible from the home terminal concerned. The home terminal concerned is used as a search demand generating terminal, and a state is changed into the state waiting for a search reply.

0130] Processing 2818: When waiting time exceeds [the case where the following distribution place is in the waiting state which will be in the state which can be distributed] default value, before progressing and exceeding to processing 2819, it returns to processing 2807.

0131] Processing 2819: An obstacle message is generated and it sends to a center server. It will be in the state waiting for a reply (obstacle evasion round list) from a center.

0132] Next, the processing flow of the base station obstacle evasion processing called from the move agent execution program 117 mentioned above is shown in drawing 29, and it explains below.

0133] Processing 2901: A state is in the state waiting for a base station search reply, and when an event is search reply reception, it progresses to processing 2902 and progresses to processing 2907 except it.

0134] Processing 2902: When a search reply is NULL, it progresses to processing 2912, and it progresses to processing 2903 except it.

0135] Processing 2903: When the home terminal concerned is a search demand generating terminal, it progresses to processing 2904, and it progresses to processing 2906 except it.

0136] Processing 2904: An obstacle report in transmission of an agent and the center is transmitted via the home terminal of a search reply.

0137] Processing 2905: A base station search reply waiting state is ended.

0138] Processing 2906: A search reply is transmitted to search demand transmitting origin.

0139] Processing 2907: When an event is reception of a base station search demand, it progresses to processing 2908, when other, this base station obstacle evasion processing is ended, and it returns to a calling agency.

0140] Processing 2908: When there are no abnormalities in the connection base station of the home terminal concerned, it progresses to processing 2909, and it progresses to processing 2910 except it.

0141] Processing 2909: As a search reply, ID of the home terminal concerned is sent a reply, base station obstacle evasion processing is ended, and it returns to a calling agency.

0142] Processing 2910: When there is no transceiver mode connectable non-searched terminal, it progresses to processing 2911, and it progresses to processing 2912 except it.

0143] Processing 2911: NULL is returned as a search reply, base station obstacle evasion processing is ended, and it returns to a calling agency.

0144] Processing 2912: When search is completed from the home terminal concerned about all the terminals in which transceiver mode connection is possible, it progresses to processing 2906, and it progresses to processing 2913 except it.

0145] Processing 2913: The demand of normal base station search is transmitted to the terminal in which search unsettled Mino transceiver mode connection is possible, it will be in the state waiting for a base station search reply, base station obstacle evasion processing is ended, and it returns to a calling agency.

0146]

Effect of the Invention] In the server which distributes a move agent according to this invention as stated

above Time concerning a round is made controllable by separating and managing a round list from an agent program, predicting the time which a round takes from the home terminal information on a round place, and the information on the program executed at a round place, and dividing and distributing a round place to two or more groups if needed.

[Brief Description of the Drawings]

Drawing 1] An example of the composition of the whole system which realizes this invention, and hardware composition is shown.

Drawing 2] The flow of the processing in the whole system which realizes this invention is shown.

Drawing 3] An example of a software configuration and the flow of data in the server which realizes this invention are shown.

Drawing 4] An example of a software configuration and the flow of data in the home terminal which realizes this invention are shown.

Drawing 5] The constituent factor of contract data and an example of a data format which a move agent distribution program uses in a server are shown.

Drawing 6] The constituent factor of service program data and an example of a data format which a move agent distribution program uses in a server are shown.

Drawing 7] The constituent factor of obstacle data and an example of a data format which a move agent distribution program uses in a server are shown.

Drawing 8] The constituent factor of service schedule management data and an example of a data format which a move agent distribution program uses in a server are shown.

Drawing 9] A move agent's constituent factor which a move agent distribution program generates and distributes in a server, and an example of a data format are shown.

Drawing 10] The constituent factor of an obstacle message sent to a server from a home terminal at the time of an obstacle and an example of a data format are shown.

Drawing 11] The constituent factor of move agent run state management data and an example of a data format which a move agent distribution program uses in a server are shown.

Drawing 12] The flow of the processing at the time of the obstacle under move agent round is shown.

Drawing 13] It is the flow chart of the event processing routine in a server.

Drawing 14] It is the flow chart of the agent distribution processing started from the program shown in drawing 13 .

Drawing 15] It is the flow chart of the distribution zone split application started from the program shown in drawing 14 .

Drawing 16] It is the flow chart of the round time prediction processing started from the program shown in drawing 15 .

Drawing 17] It is the flow chart of the end processing of a move agent started from the program shown in drawing 13 .

Drawing 18] It is the flow chart of the message arrival processing started from the program shown in drawing

13 .

Drawing 19] In a server, an event processing routine is the flow chart of the service schedule management routine which operates independently.

Drawing 20] It is the flow chart of the event processing routine including the move agent execution processing in a home terminal.

Drawing 21] When a specific obstacle occurs during a move agent round, or when the administrator of a server requires, it is an example of the display screen which shows a move agent's execution situation displayed on the display device of a server.

Drawing 22] An example of the whole composition of a system which realizes this invention using the correspondence procedure connected through a base station is shown.

Drawing 23] It is the figure showing the constituent factor of contract data and an example of a data format which a move agent distribution program uses in a server.

Drawing 24] The example of the table data which packed into one group the terminal in which transceiver node connection is possible generated based on the contract data shown in drawing 23 is shown.

Drawing 25] The example of a move agent's round list group in the system which realizes this invention is shown.

Drawing 26] An example of a software configuration and the flow of data in the home terminal which realizes this invention are shown.

Drawing 27] It is the flow chart of the distribution zone split application started from the program shown in drawing 14 .

Drawing 28] It is the flow chart of the event processing routine including the move agent execution processing in a home terminal.

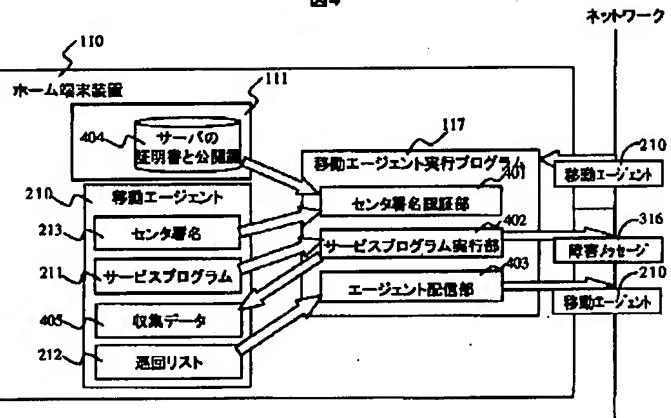
Drawing 29] It is the flow chart of the base station obstacle evasion processing started from the program shown in drawing 28 .

[Explanations of letters or numerals]

100 -- A server, 101 -- Secondary storage equipment, 102 -- Main memory unit, 103 -- A central processing unit, 104 -- A communication apparatus, 105 -- Primary control program, 106 -- A move agent distribution program, 107 -- Communications program, 108 -- A database maintenance control program, 109 -- A communication apparatus, 110 -- Home terminal unit, 111 -- Secondary storage equipment, 112 -- A main memory unit, 113 -- Central processing unit, 114 [-- A move agent execution program, 118 / -- A home network communications program, 119 / -- Internet communications program] -- A communication apparatus, 115 -- A home network communication apparatus, 116 -- A primary control program, 117

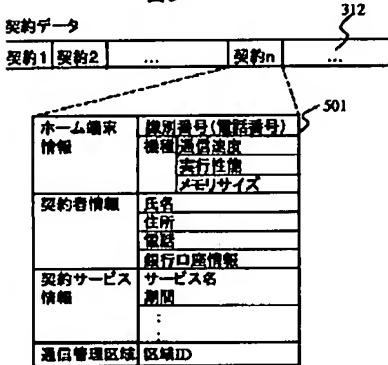
Drawing 4]

図4



Drawing 5]

図5

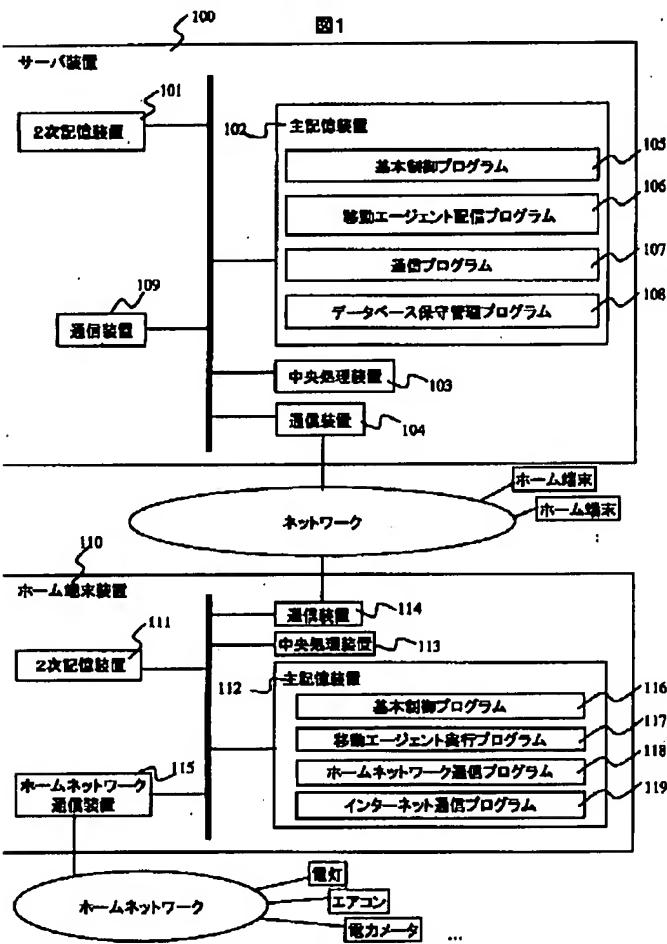


Drawing 10]

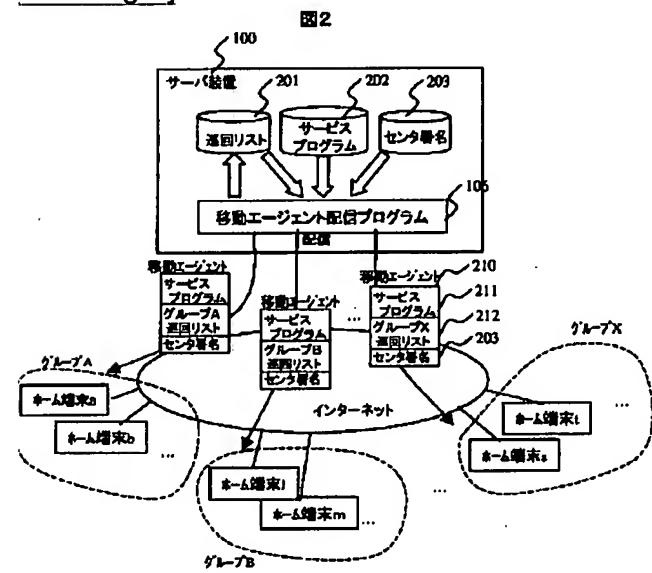
図10

障害メッセージ	
移動エージェント識別番号	316
障害ホーム端末識別番号	
障害発生/障害回復	
発生時間	

Drawing 1]

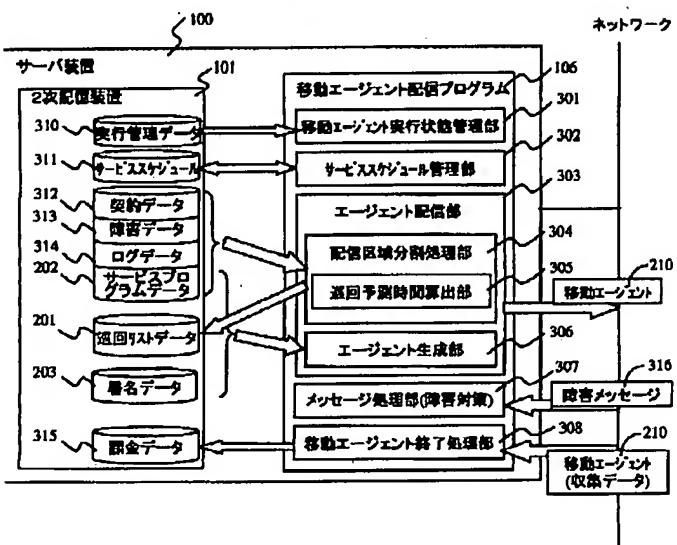


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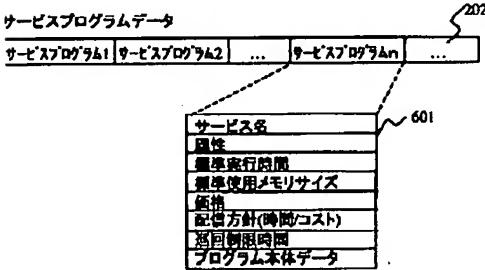
Drawing 3]

図3



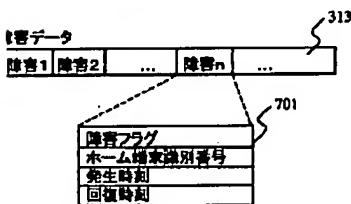
Drawing 6]

図6



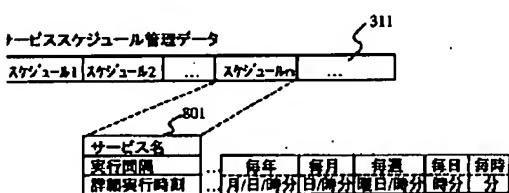
Drawing 7]

図7



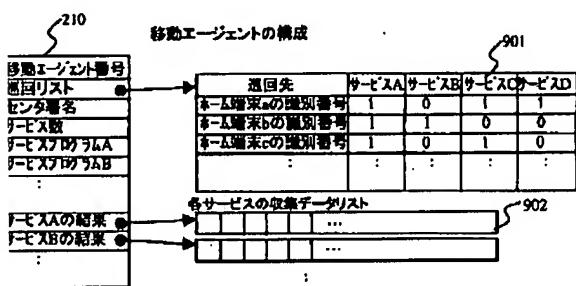
Drawing 8]

図8



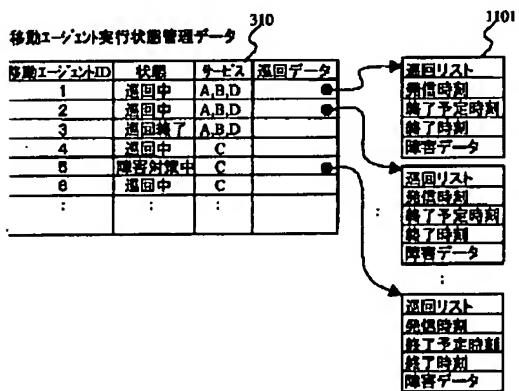
Drawing 9]

図9



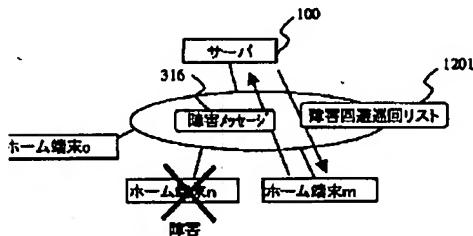
Drawing 11]

図11



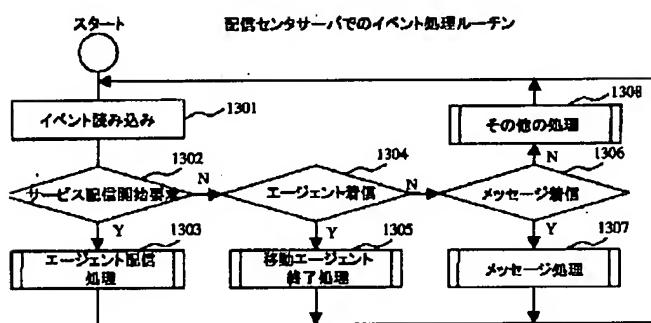
Drawing 12]

図12



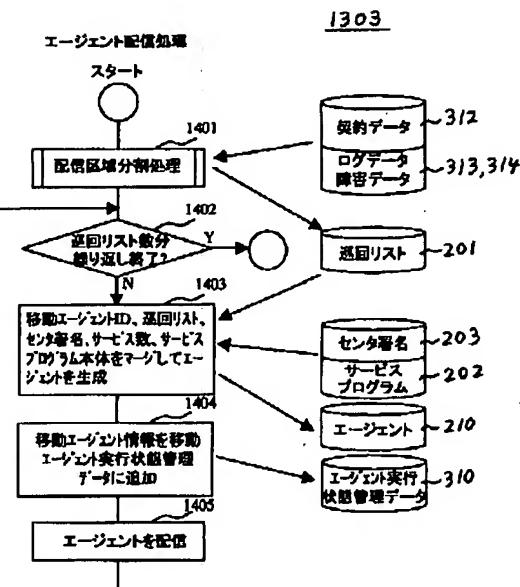
Drawing 13]

図13



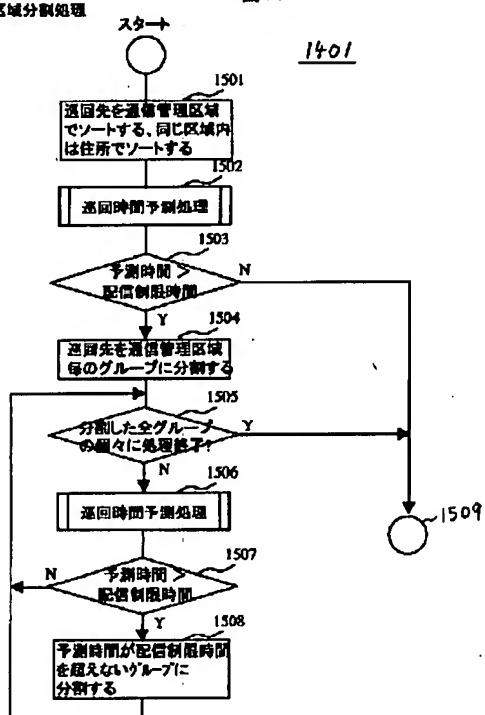
Drawing 14]

図14



Drawing 15]

図15



Drawing 16]

図16

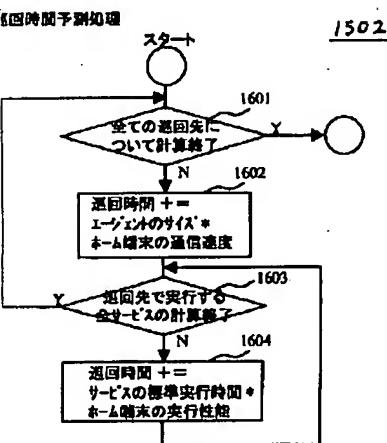


図17

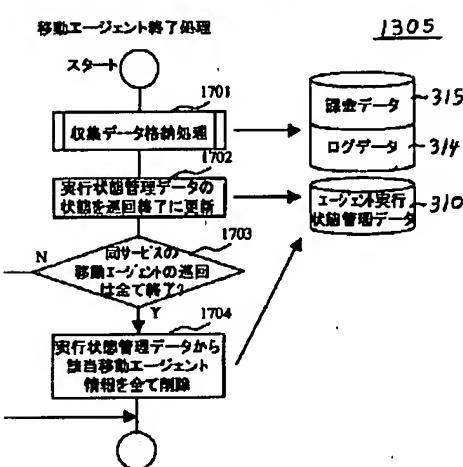
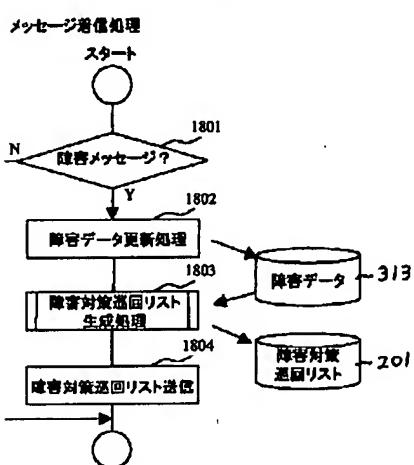


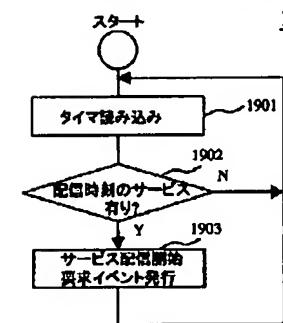
図18



Drawing 19]

図19

トーバでのサービススケジュール管理ルーチン

302

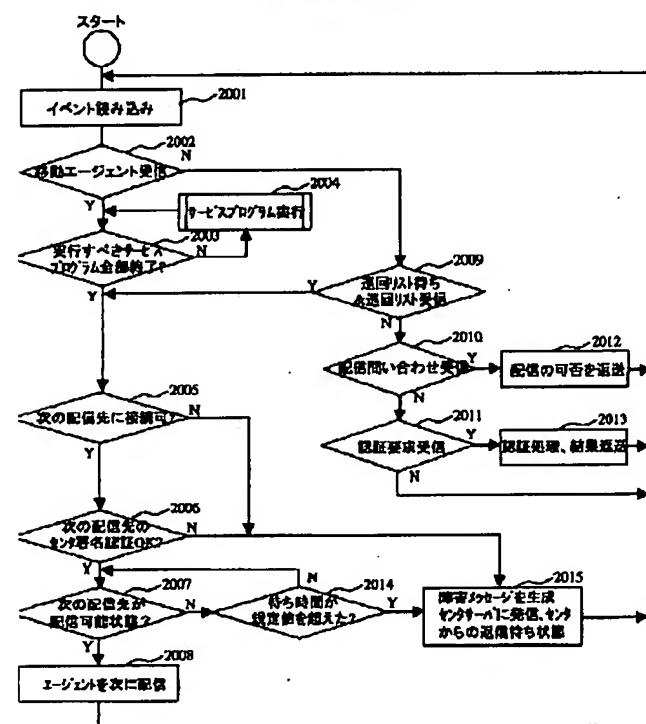
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TARGET="odse_itm_draw"> drawing 20]

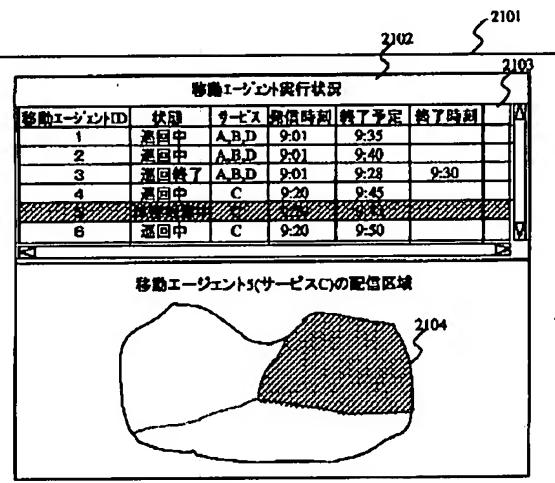
図20

ホーム端末での処理



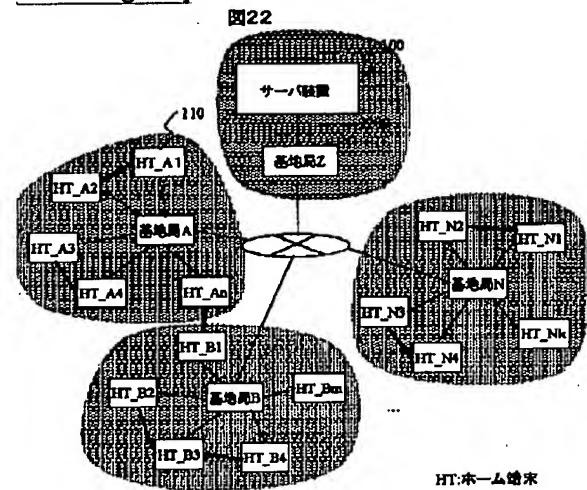
Drawing 21]

図21



Drawing 22]

図22



Drawing 23]

図23

契約データ		312		
契約1	契約2	...	契約n	...
ホーム端末情報	識別番号(電話番号) 機種 通信速度 実行性能 スクリーンサイズ	2300		
契約者情報	氏名 住所 電話 銀行口座情報			
契約サービス情報	サービス名 範囲 ...			
通信管理区域 携帯電話情報	区域ID 基地局ID トランシーバーID 接続端末 ...	2301	2302	

Drawing 24]

図24

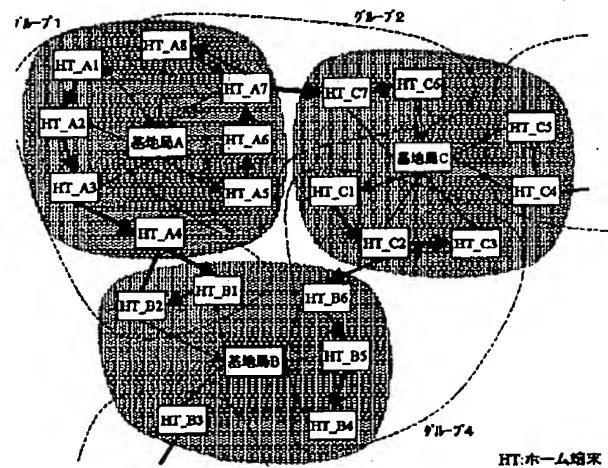
ランシーバモード接続グループ一覧

グループ	ホーム端末リスト	基地局
1	HT_A1	A
	HT_A2	A
	HT_A3	A
	HT_A4	A
	HT_B1	B
	HT_B2	B
2	HT_A5	A
	HT_A6	A
	HT_A7	A
	HT_A8	A
	HT_C7	C
	HT_C8	C
3	HT_B3	B
	:	:
	HT_B4	B
	HT_B5	B
	HT_B6	B
	HT_C2	C
4	HT_C1	C
	HT_C3	C
	HT_C4	C
	HT_C5	C
	:	:
	HT_C6	C
5	HT_C7	C
	HT_C8	C
	:	:
	HT_C9	C
	HT_C10	C
	:	:

HT:ホーム端末

Drawing 25

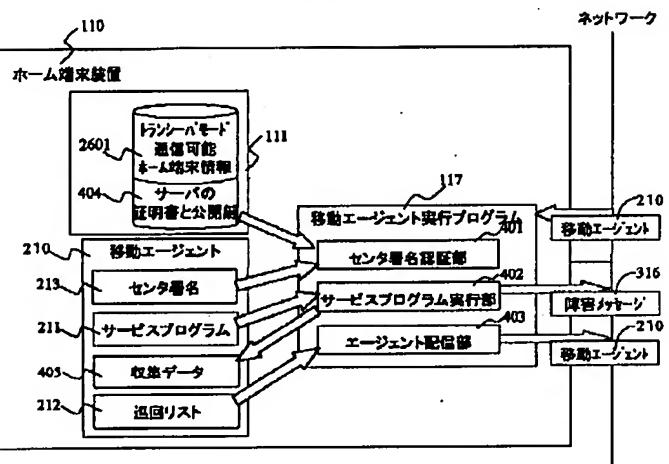
図25



HT:ホーム端末

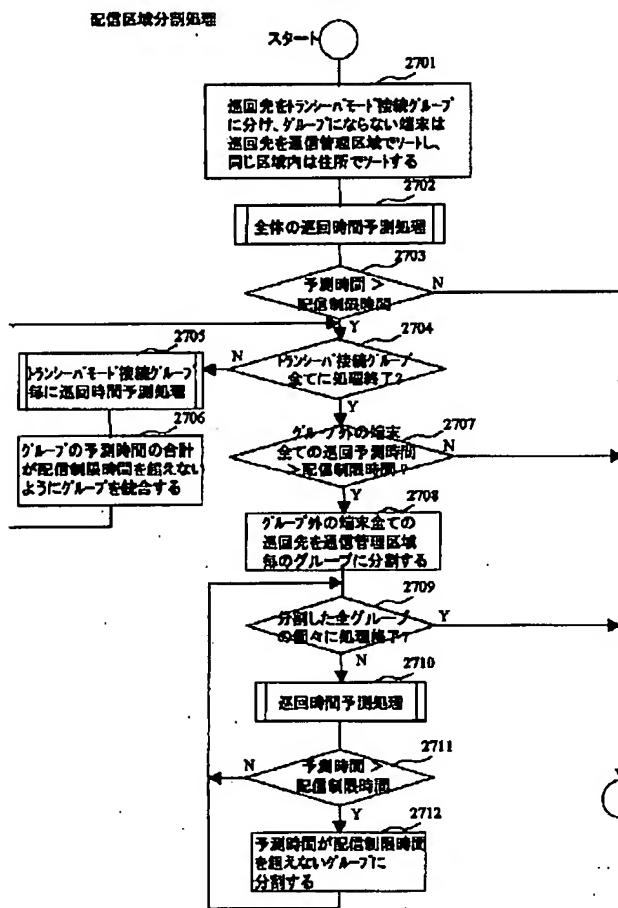
Drawing 26

図26



Drawing 27

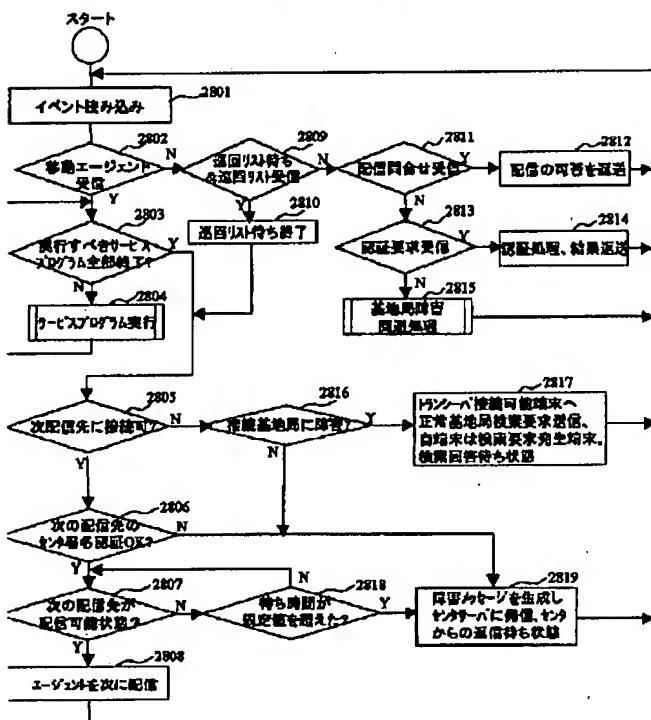
図27



Drawing 28]

図28

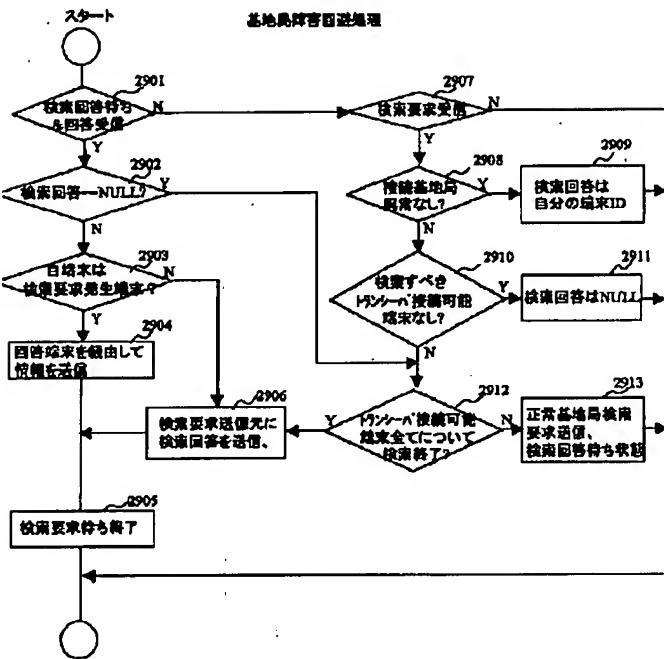
ホーム端末での処理



Drawing 29]

図29

基地局検索回路処理



Translation done.]